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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/708,271	02/20/2004	Douglas R. Luopa	49879.1	2270

22828 7590 10/04/2007
EDWARD YOO C/O BENNETT JONES
1000 ATCO CENTRE
10035 - 105 STREET
EDMONTON, ALBERTA, AB T5J3T2
CANADA

EXAMINER	
OLSEN, KAJ K	
ART UNIT	**PAPER NUMBER**
1753	

MAIL DATE	DELIVERY MODE
10/04/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)
	10/708,271	LUOPA ET AL.
	Examiner	Art Unit
	Kaj K. Olsen	1753

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-18* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-18* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *5-4-04*.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claims 9, 10, and 17 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

3. Claim 9 further limits claim 8 by specifying that the cathode comprises either stainless steel or nickel-plated ferrous pipe. This is confusing because stainless need not contain nickel and claim 8 clearly required the use of nickel. For the purpose of examination, the examiner will presume that the stainless steel of claim 9 is a nickel containing stainless steel, but clarification is requested.

4. Claim 10 states that the cathode be comprised of a metal lower on the electromotive series than the anode. This contradicts the specification, which states that the "cathode must of course be higher on the electromotive series (less readily oxidized) than the anode" (paragraph 0031). For the purpose of examination, the examiner will interpret claim 10 as requiring a metal *higher* on the electromotive series.

5. Claim 17 states that it depends from the "method of claim 15", but claim 15 is a system claim and not a method claim. Applicant appears to have meant the --method of claim 16-- and the examiner has interpreted it as such for the purpose of this office action.

Claim Rejections - 35 USC § 103

6. Claims 1-7 and 10-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wang et al (Corrosion 2002, paper no. 02276, pp. 1-15, 2002) in view of Murray (USP 4,950,453) and with or without the further teaching of Morales et al (Corrosion 95, paper no. 116, pp. 1-15, 1995.

7. Wang discloses a corrosion monitoring system comprising a test fluid circuit G, a pipe connection C comprising a draw-off valve V for supplying fluid to the test circuit, a fluid return connection (pipe to the left of G in fig. 2) for returning fluid to the pipe at a point downstream from the pipe connection, and a pump for returning fluid to the fluid return connection. See fig. 2 and the Experimental Setup and Procedure of p. 2. Wang does not explicitly disclose the use of a galvanic cell as the test fluid circuit, but relies on a different probe for monitoring the performance of the corrosion inhibitor. Murray discloses in an alternate sensor for monitoring corrosion inhibition the use of a galvanic circuit comprising an anode and cathode (16, 18) with an electrical insulator 14 disposed between where the anode and cathode are connected to an ammeter 30. See the figure and col. 4, ll. 35-49. Murray demonstrates that such a galvanic probe provides an unambiguous current signal for the determination of whether the surface is appropriately treated or not. See col. 4, l. 62 through col. 5, l. 2 and Table III in col. 7. Because both Wang and Murray disclose methods for monitoring the effectiveness of a corrosion inhibitor, it would have been obvious to one of ordinary skill in the art at the time the invention was being made to substitute one known method for the other to achieve the predictable result of monitoring the corrosion of the measured system. With respect to the corrosion monitoring system being for a pipe transporting a fluid, that is only the intended use of the apparatus and the

intended use need not be given further due consideration in determining patentability. However, the main purpose of the teaching of Wang is for modeling the corrosion and inhibitor performance of systems utilized for pipelines. See the Introduction discussing pipelines and the Experimental Setup and Procedure where the tank being monitored is filled with a solution typical of pipelines (i.e. oil and saltwater). Furthermore, Morales discloses monitoring the corrosion behavior by connecting its monitoring means directly to a pipe of a oil/gas well head in order to monitor the corrosion under real, but well controlled conditions. See paragraph 1 of Experimental section. Even if the preamble reference to pipes were to be interpreted as further limiting the system, it would have been obvious to one of ordinary skill in the art at the time the invention was being made to utilize the system of Wang and Murray on an actual pipe or pipeline as set forth my Morales so as to provide real *in situ* analysis of the effectiveness of the utilized corrosion inhibitors. With respect to the pump being between the galvanic cell and the fluid return connection, Wang discloses the pump earlier in the fluid loop. However, the basic job of the fluid pump is to impel fluid through the fluid loop and one possessing ordinary skill in the art would recognize that the pump could be located almost anywhere along the fluid loop, including between the galvanic cell and fluid return connection, and still provide the desired function to impel the fluid through the fluid loop.

8. With respect to a second fluid circuit, Wang teaches a bypass circuit B that is located downstream of a portion of the pipe connection but upstream from the galvanic cell. See fig. 2 of Wang. With respect to the means for measuring the flow rate, Morales discloses the use of flow meters FU1-FU3 presumably for monitoring the flow that Morales deemed critical to understanding corrosion behavior (see Effect of Fluid Velocity on pp. 3 and 4). It would have

been obvious to one of ordinary skill in the art at the time the invention was being made to add a flow meter to the second circuit of Wang so as to be able to monitor the flow through the fluid loop.

9. With respect to the claimed relationship between length of pipe to inner diameter of the cell, Wang constructed the flow loop out of 15 m of pipe having an inner diameter of 101.6 mm. See the Experimental Setup and Procedure on p. 2. This means that the amount of straight pipe being utilized has a length that is almost 150 times the inner diameter of the pipe containing the fluid circuit. This clearly indicates that the use of preceding and succeeding pipes having length of 5, 10, or 15 times the inner diameter of the cell are obvious choices of length.

10. With respect to claim 7, because the pipe is not part of the claimed invention (see discussion above), specifying that the anode is a substantially similar metal or alloy as that of the pipe does not further define the system itself.

11. With respect to the cathode being a metal *higher* (see 112 rejection above) on the electromotive series than the anode, this is inherent for any galvanic probe, including the probe of Murray, because it is the anode that must undergo the oxidation in a galvanic cell.

12. With respect to the surface area of the cathode being larger that the area of the anode, Morales taught that others found that a high cathode to anode ratio gave higher rates of corrosion. See reference to Soldfield on p. 4. Because the goal of the cathode and anode of Wang in view of Murray is to monitor the presence of corrosion, the use of a cathode that is larger than the anode would give more current for a given level of the corrosive conditions. It would have been obvious to one of ordinary skill in the art at the time the invention was being made to utilize this suggestion from Morales for the system of Wang and Murray so that the

provided fluid circuit provides a higher current for a given level of corrosive conditions thereby making the corrosive conditions easier to detect. With respect to ratio of at least 1.5 or about 3, it would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize these ratios, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

13. With respect to either the anode or cathode being downstream of the other, the fluid circuit of Murray does not appear to have any preferred orientation, nor is there any phenomenological reason to utilize a particular preferred orientation. Placing either the anode or cathode downstream of the cathode and anode respectively would have been obvious because it would have provided the same sensor performance.

14. With respect to the method claims, both Wang and Murray teach monitoring the performance of the inhibitor both before and after the inhibitor is injected into the system. See Wang, Results and Discussion starting on p. 2 and see Murray, Table III.

15. With respect to operating the pump at a speed such that flow velocity through the test cell is substantially similar to flow velocity through the pipe, Wang noted that the corrosion due to gas/oil/water flowing through pipeline is dependent on a number of factors including flow rates. See the Introduction. Because Wang is attempting to model the flow behavior through pipes, one possessing ordinary skill in the art would have been motivated to utilize substantially the same flow rate as through the pipeline so as to create conditions that most closely mimic the conditions existing within a pipeline.

16. Claims 7 and 10 in the alternative is rejected under 35 U.S.C. 103(a) as being unpatentable over Wang in view of Murray and optionally Morales as applied to claim 1 above, and further in view of Maes et al (USP 4,095,176).

17. In the above rejection, the examiner took the position that claim 7 does not further define the system of claim 1 because the pipe is not being claimed and is merely the intended use of the system. Even if the examiner were to give claim 7 further due consideration, then claim 7 would be obvious over the further teaching of Maes. In particular Maes teaches in an alternate corrosion probe that the working electrode of the corrosion probe should be made of the same metal as surface layer being probed presumably so that the corrosion response at the working electrode most closely resembles the corrosion response of the surface layer. See col. 1, ll. 25-36. For the sensor of Murray, the anode being attacked by the corrosive fluid would be analogous to a working electrode. It would have been obvious to one of ordinary skill in the art at the time the invention was being made to utilize the further teaching of Maes for the system of Wang, Murray, and with or without Morales so that the response seen by the anode most closely resembles the response seen by the metal surfaces that are being protected by the inhibitor.

18. Claims 8 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wang, Murray, and with or without Morales (or further comprising Maes) as applied to claim 7 above, and further in view of Jasinki (USP 4,752,360).

19. The references set forth all the limitations of the claims, but did not explicitly recite the use of a nickel containing cathode, including a nickel containing stainless steel. Jasinski teaches in an alternate corrosion probe that nickel containing stainless steels like 316 and N-80 find utility in corrosion probes because they are not readily corroded by corrosive fluids. See col. 33,

l. 60 through col. 34, l. 44. Because the cathode of a galvanic cell is not supposed to be reactive in corrosive fluids (only the anode should be oxidized by the fluid), it would have been obvious to one of ordinary skill in the art at the time the invention was being made to utilize this teaching of Jasinski for the system of Wang, Murray, and with or without Morales (or further comprising Maes) so as to keep the cathode from degrading in the corrosive fluid.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kaj Olsen whose telephone number is (571) 272-1344. The examiner can normally be reached on Monday through Friday from 8:00 A.M. to 4:30 P.M..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nam Nguyen, can be reached on 571-272-1342. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

AU 1753
September 27, 2007

Kaj Olsen

KAJ K. OLSEN
PRIMARY EXAMINER